HIGH RESOLUTION FLOOD MAPPING FOR KUALA LUMPUR

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JBA risk management

THE FLOOD PEOPLE.

Innovate UK
MiGHT Malaysian Industry-Government Group for High Technology
Newton-Ungku Omar Fund
SCIENCE to ACTION

AGENDA

- Project Aims
- Modelling
- Stationarity research
- Virtual Reality –KL flood risk scenario modelling

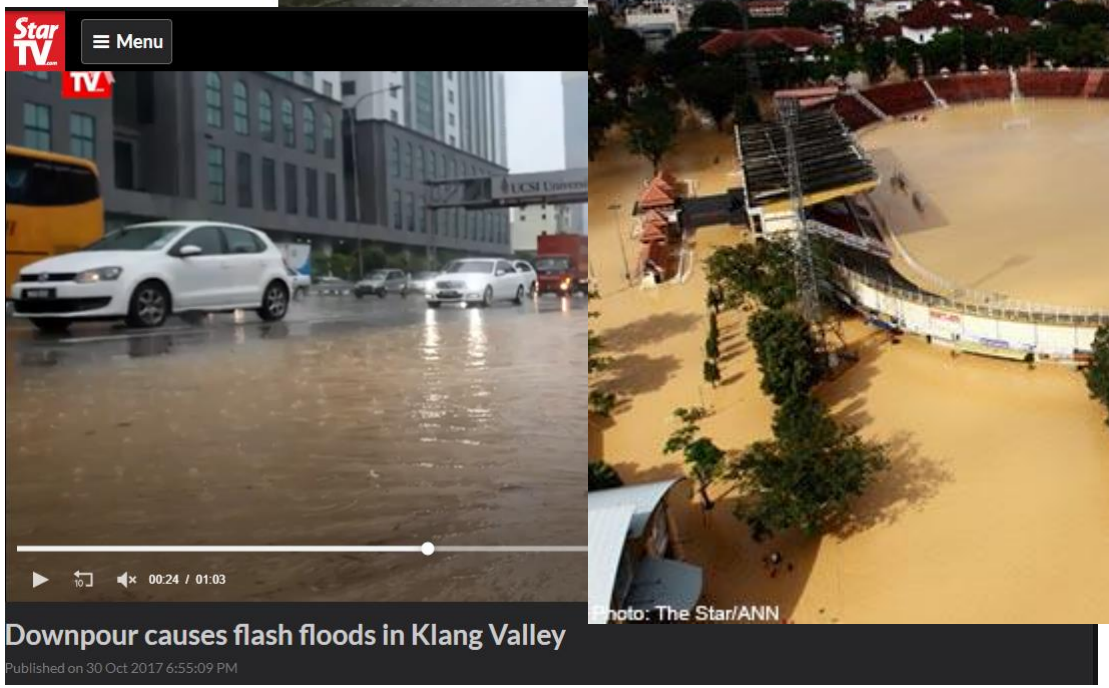
Flash floods hit parts of KL city following heavy downpour

NATION

Sunday, 11 Nov 2018

1:46 PM MYT

By M. KUMAR



Downpour causes flash floods in Klang Valley

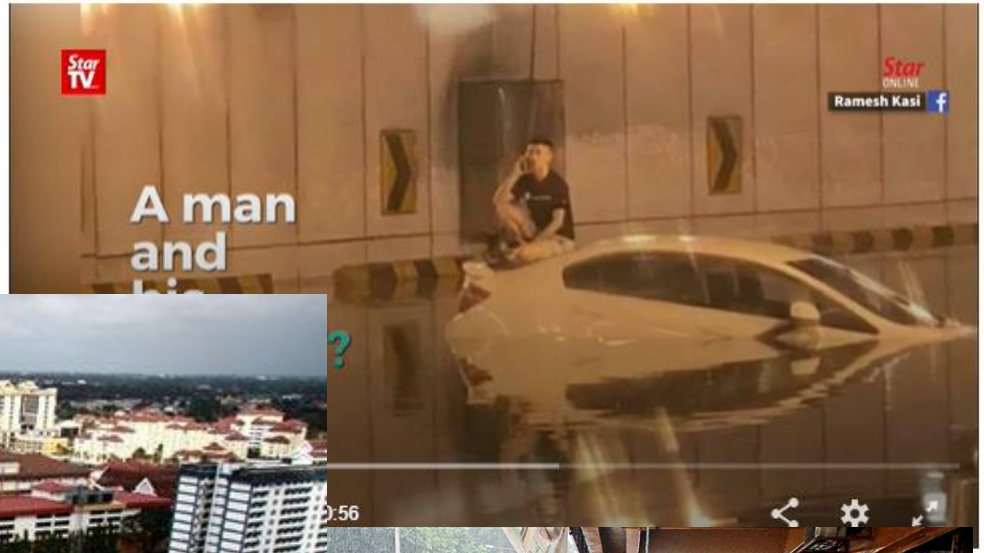
Published on 30 Oct 2017 6:55:09 PM

Several areas in KL hit by flash floods after heavy rain

NATION

Monday, 12 Nov 2018

12:00 AM MYT



PROJECT AIMS - JBA

- **Disaster resilient cities**
  - Develop return period flood hazard maps for DBKL
  - Close collaboration with Malaysian NUOF partners to make use of ‘best available’ local data and knowledge
  - Use of the maps
    - Deployed in the multi-hazard platform
      - Planning
      - Flood risk communication
      - Mitigation
      - Encourage wider stakeholder engagement

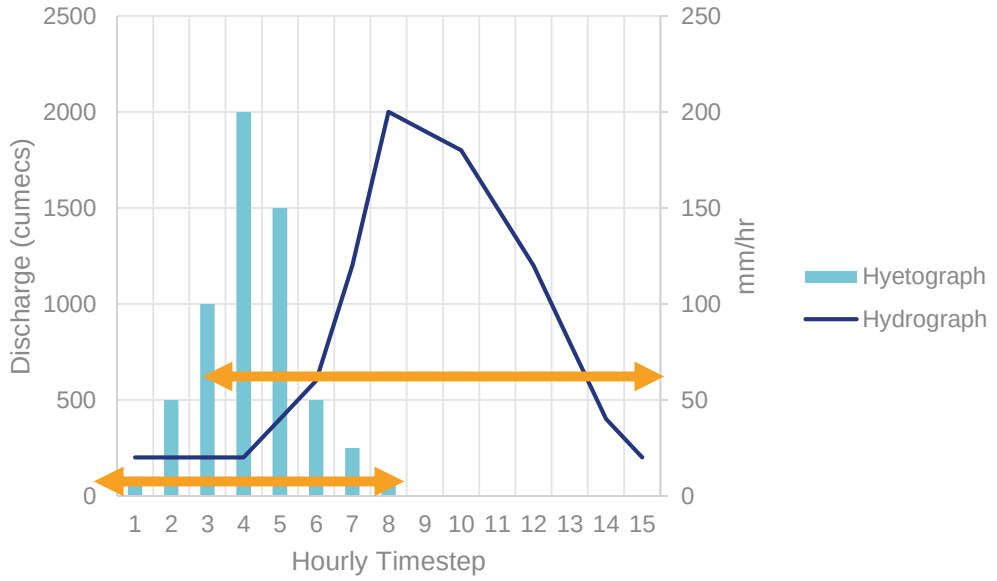
MAP DEVELOPMENT

Elevation data
- Acquire and process bare-earth Digital Terrain Model
- Removal of structures such as levees and bridges

Hydrology
- Estimate return period rainfall hyetographs
- Estimate hydrological losses and variable runoff rates
- Estimate return period river flows for all streams & rivers

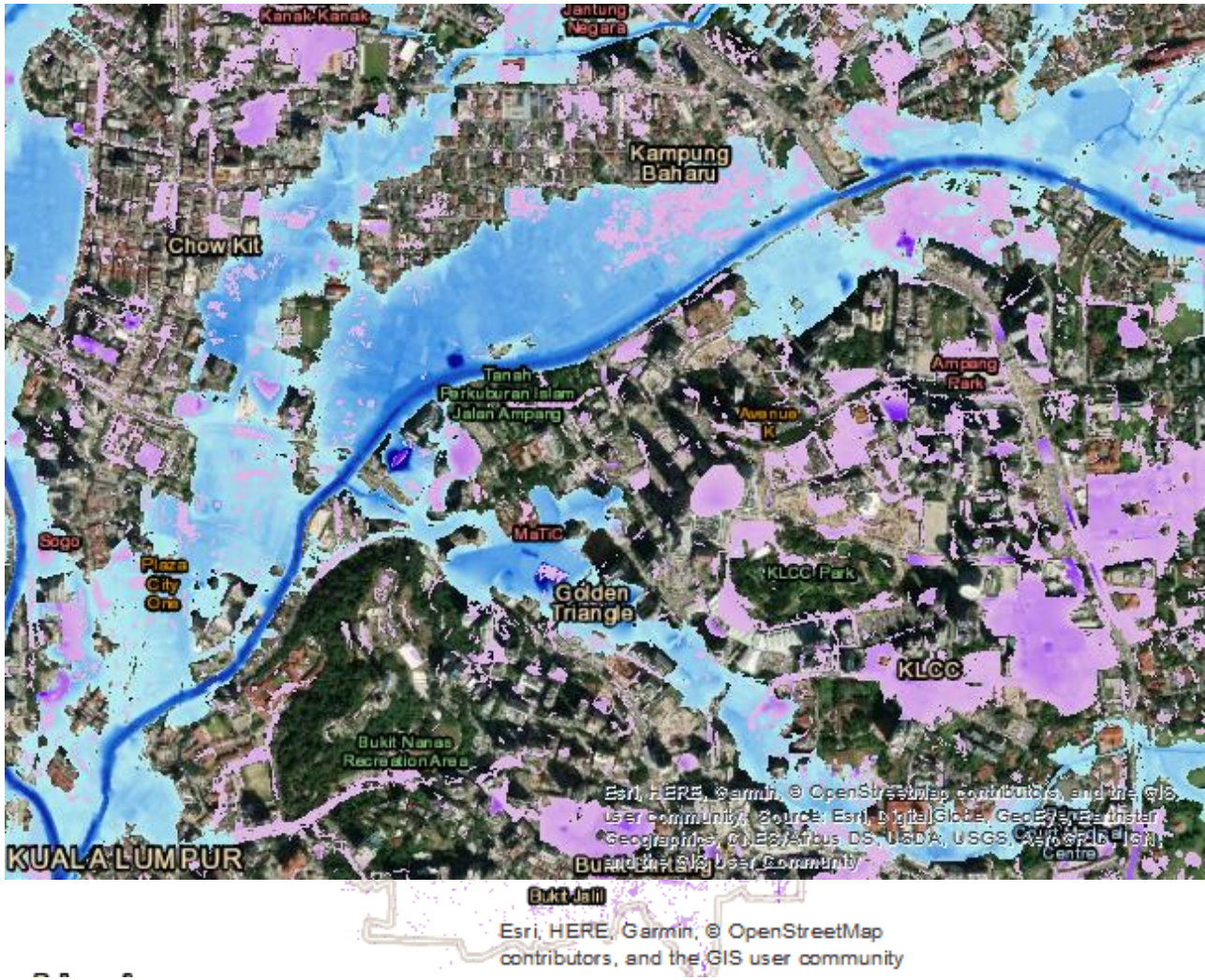
Inundation mapping
- Direct-rainfall hydraulic modelling to capture pluvial flood hazard
- River hydraulic modelling

GIS Data / Map creation
- Process hydraulic model output into seamless water depth layers
- Creation of additional information such as risk scores



KUALA LUMPUR FLOOD MAPS

- Direct rainfall (Flash Flooding)
- River Flood Maps
  - With SMART tunnel
  - Undefended
- Return periods – 20, 50, 100, 200



STATIONARITY RESEARCH

Non-stationary flood frequency analysis in Langat basin, Malaysia

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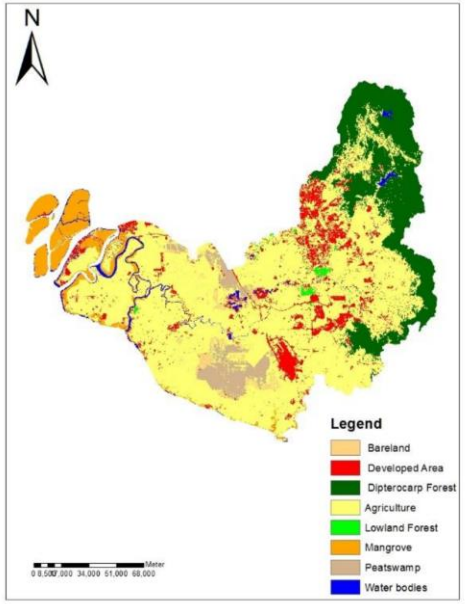
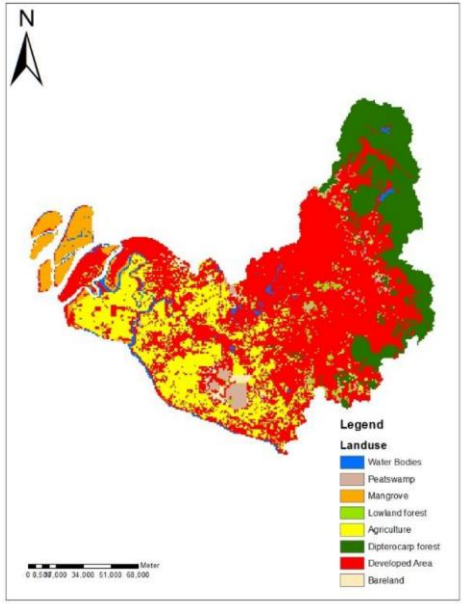
11th World Congress on Water Resources and Environment (EWRA 2019)
"Managing Water Resources for a Sustainable Future"
Madrid, Spain, 25-29 June 2019

STATIONARITY RESEARCH

- Land use change has been significant
- Forestry decrease of 20% (1981-2001)
- Urban area increase of 15% (1981-2001)
- Developments
  - KL airport
  - Multimedia Super Corridor (MSC)
- Method
  - Hourly timestep 1978-2018
  - Non-stationarity test - GAMLSS method (Stasinopoulos and Rigby 2007)



1996

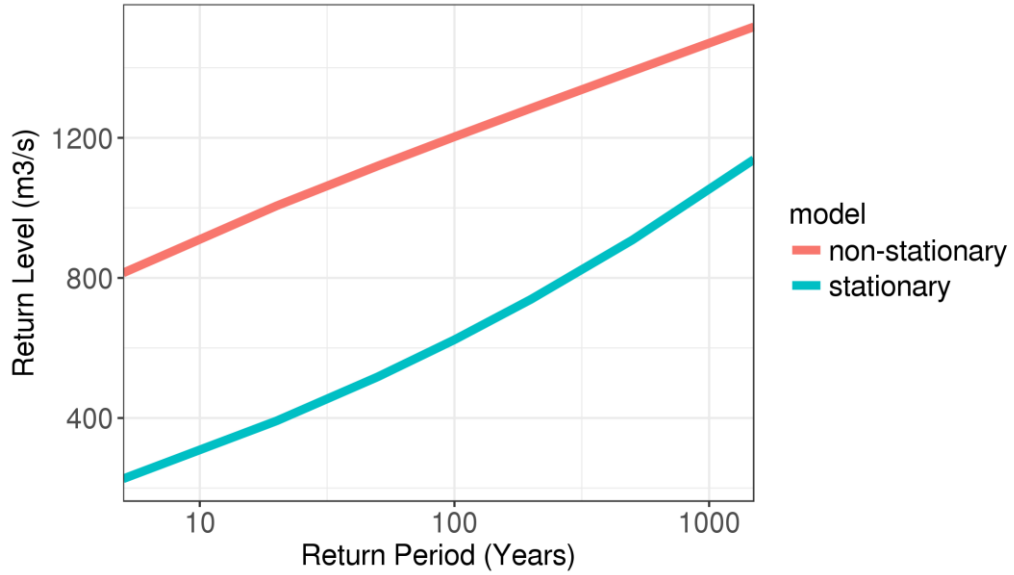


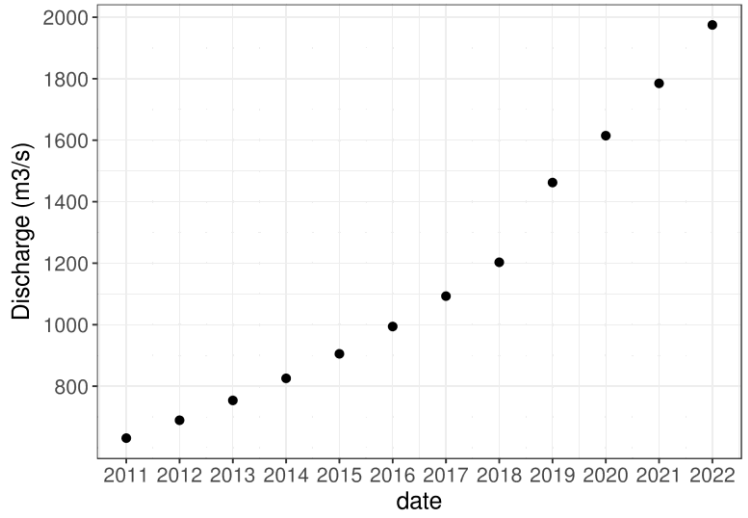
2016

Majid et al 2016

STATIONARITY RESEARCH

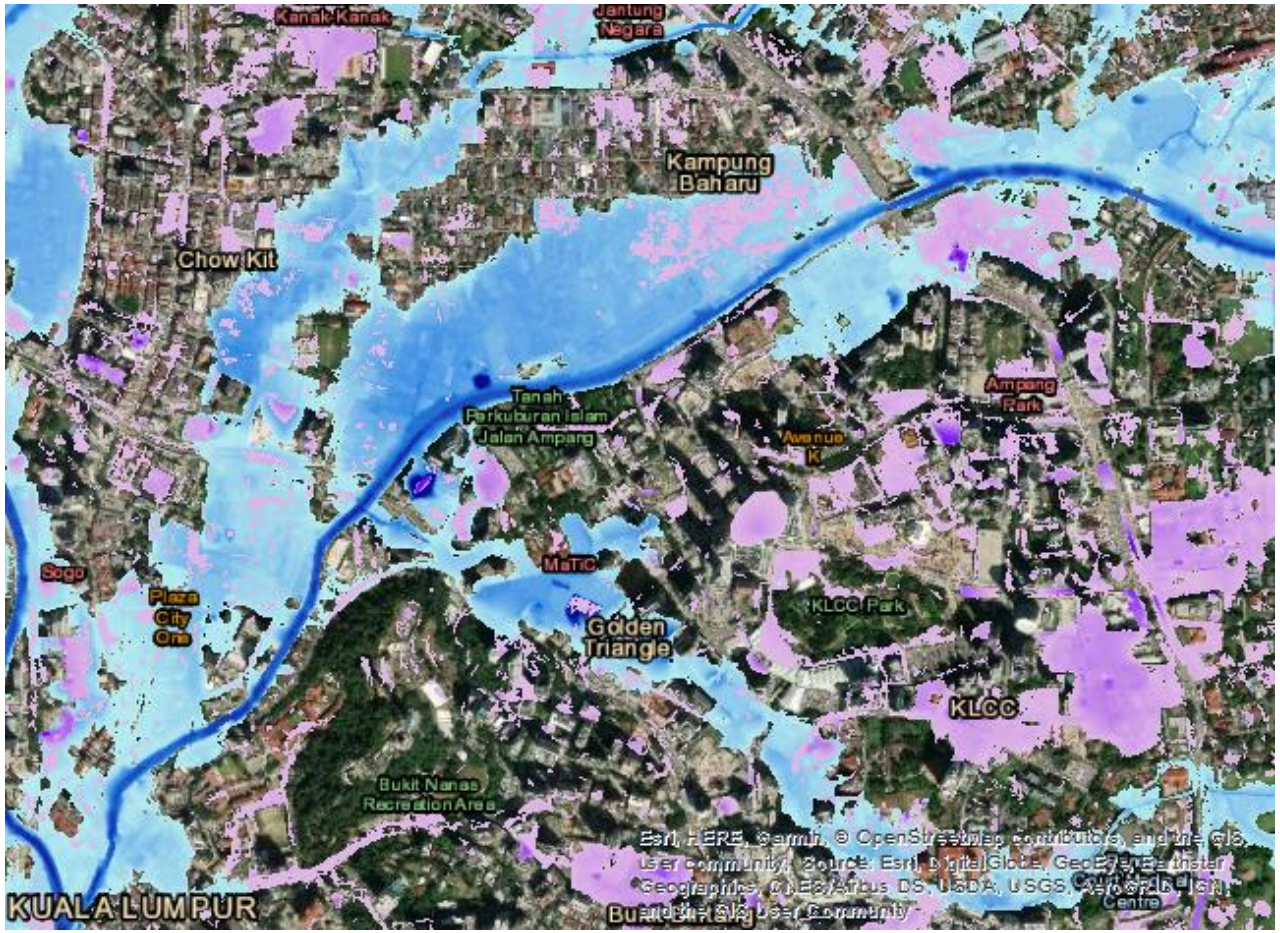
- Statistical significance – Mann-Kendall & Petit test
- Suggests Non-Stationarity flood frequency analysis is required for the Langat basin
- Faster flood response / Increase AMAX





Difference in the 100-year return period estimate with time

VIRTUAL REALITY – KL FLOOD VISUALISATION



THE SMALL PRINT

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